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PROFITABILITY IMPLICATIONS OF SUSTAINABLE CONTRACTING

BY

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PROFITABILITY IMPLICATIONS OF SUSTAINABLE CONTRACTING

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LIST OF ABBREVIATIONS

USGBC	United States Green Building Council
D&B	Dunn and Bradstreet
DJSI	Dow Jones Sustainability Index, United States
DJGI	Dow Jones Global Index, United States
SIC	Standard Industrial Classification
EOY	End of year
ttm	Trailing twelve months

ABSTRACT

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Profitability Implications of Sustainable Contracting
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Certain construction companies have adopted "green" building methods and practices while most of the industry continues to provide traditional construction services in traditional ways. The green building methods include managing waste streams effectively, using environmentally friendly materials, and working with other green companies and groups. The benefits of green construction have been explored as they relate to the environment, society, and even building owners. Several logical benefits have been postulated for green contractors, from better brand name to reduced costs associated with waste and insurance. This research explores the correlation between green construction and the economic success of companies. Through financial data analysis of a study group of green companies in the construction industry, a control group of similar companies without a sustainability focus, and the construction industry as a whole, the connections between business strategy and profit are investigated. Qualitative and subjective data are employed to assist in the interpretation of the quantitative findings, and the entire study is placed into context by the use of a contractor survey which explores the current perceptions of green construction in the industry. The major conclusion of the study is that there is not a notable negative economic impact associated with being a green company in the construction industry.

CHAPTER 1. INTRODUCTION AND METHODOLOGY

1.1. Objectives

There are a growing number of contractors in the construction industry which have embraced sustainable business practices [1, 2]. The decision to embrace sustainability is driven by the triple bottom line issues of environmental, economic and social impacts [3-5]. "Green" in this study means a contractor or facility that has incorporated a concern for people (workers and occupants) and the environment. A green company is one that offers green construction services, is mindful of minimizing the impact of their activities on the environment, and has an eye toward improvements in efficiency and safety. A green construction company manages their waste effectively, uses environmentally friendly materials, provides green building construction services, and avoids working with companies and groups who show disregard for the environment and people. A green building is one that incorporates energy saving systems, water saving systems, improved internal air quality, and is designed and constructed in a way that minimizes its impact on the environment. The environmental and social impacts of becoming green are at best positive and at worst neutral [1, 3, 6]. The economic impact of business decisions is benefit reflected in profit [7-8], and this study presents several investigations into the correlation between a contractor's economic success and their decision to be green in order to bring to light whether green construction is beneficial to the contractors or not. Green building services are well documented by the United States Green Building Council (USGBC) [2], and sustainable practices are highlighted by their placement of the environment and people in the forefront of decisions [4-5].

The hypothesis that motivates this study is that green construction industry companies are likely to be less economically successful on average than the construction industry on average [9-10]. There are numerous logical reasons that green companies might be less profitable, ranging from up front costs of training, and operating costs being higher than they need to be in order to support the protection of the environment.

With the overall goal of this research being to explore the correlation between economic success and business commitment to sustainable construction, the specific objectives are to:

1. Analyze business ratios for their correlation with contractors' sustainability.
2. Assess the relevance of the selected measures for analyzing impacts of corporate decisions.
3. Create categories of contractors for analysis, including green contractors, comparable non-green contractors, the top green companies in the U.S., and the top companies irrespective of sustainability in the U.S.
4. Identify the correlations that exist between the dependent variables across the groups.
5. Place the correlations in context using a survey of construction contractors' opinions concerning green construction.

Companies are in business to maximize their triple bottom line, part of which consists of increasing profit [11]. The money that they make is reflected in their profit, which takes into account the money that they receive and the money that they spend. Localized irregularities arise when a company has a short term management strategy, but long-term, stable companies reflect their success in sustained profit. This makes profit a primary measure of success when looking at stable companies. There can also be other measures of corporate success in all three bottom line areas, such as company value and debt rating in the economic area, waste minimization in the environmental area, or popularity in the social area. This study focuses quantitatively on profit and value, within the

economic area, and their correlation with a company's emphasis on stewarding the environment and people.

Profit is a dollar value which must be normalized in order to effectively compare profitability across companies. The most direct measure of profit is a company's profit margin. There are also different accepted ways to measure profitability [12]. This study takes Dunn & Bradstreet's three ratios for assessing profitability – Return on Sales, Return on Net Worth, and Return on Assets. Combined, these ratios provide a solid means to compare a company's performance against Dunn & Bradstreet (D&B)'s assessment of the industry [13]. Value is measured and thought of in many ways. This study explores two measures that are supportive of our investigation: the price to earnings ratio and a ratio of market cap to sales.

Companies who have been able to evolve their business practices over time are likely to have embraced green building because of their level of intellectual effort and understanding of the business as a whole. There would then be a couple of interesting categories of remaining contractors: those who can't evolve their business practices, and those who can evolve their business practices but have not yet done so in the area of sustainability. This category represents the companies who could be expected to become green contractors if compelling motivations can be shown to exist. Sustainability has the potential for direct cost savings in some areas of construction as well as the business benefit from evolved business practices in general [14-16].

Evidence in this study is drawn from profitability statistics of the construction industry as reported by Dunn & Bradstreet and the financial statistics of publicly traded construction companies.

Correlations shown by this study will provide the basis for further exploration of the linkage between sustainability in business and business success across all three areas of the triple bottom line.

1.2. Organization and Research Methodology

This study covers numerous aspects of economic business success. It has 5 chapters which cover the basis, method, collection of data, analysis, and conclusions. Figure 1.1 shows that among the decisions that a business owner makes are those related to sustainability, and that all of the decisions made about the business can impact the business results represented by the triple bottom line. Among the sustainability decisions are things that protect the environment and people. Among the other decisions are hiring, firing, investing, marketing, and any other decision that does not pertain to the protection of the environment and people.

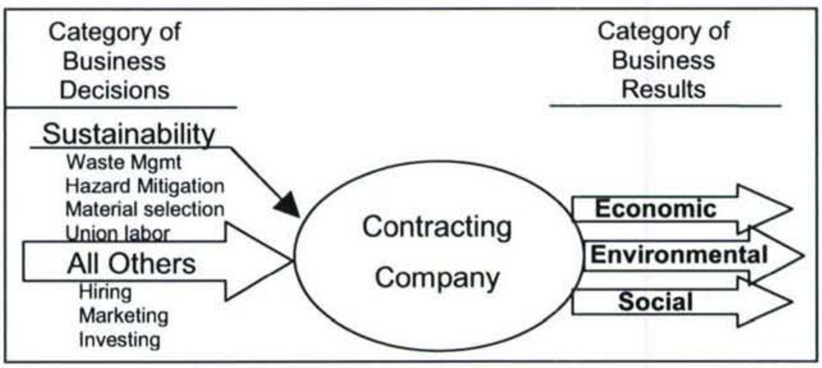

Figure 1.1 Business Decisions and Results

1.3. Research Process

The quantitative method that is used in this study is the collection of publicly available data on green contractors and the industry in general and its use for comparison. In addition, a contractor survey was used to gather information about current perspectives on green construction. In order to compare the data effectively, a list of green contractors is needed. In order to have useful data that is publicly available, only publicly traded companies are considered.

Green companies, for the purposes of this study, are identified as those companies that have been classified as green by at least one accessible source. The sources used in this study are the USGBC, Greenbuilder.com, and the Dow

Jones Sustainability Index. The USGBC web site has a list of certified professionals, and the green firms that they represent. Greenbuilder.com has a list of green contractors that have identified themselves as seeking work in green construction. The Dow Jones Sustainability Index (U.S.) is composed of the publicly traded companies who have been identified as green through the application of sustainability criteria and weights [17].

The intent of the identification process is to identify as exhaustively as possible those companies within the construction industry who are committed to green principles in their business. The underlying green principles are those in the definition above: concern for the environment and people. In the construction industry specifically, these principles manifest themselves in a number of ways including aggressive waste management programs, careful labor selection and relations, conscientious material purchasing, careful risk management, and the provision of incentives throughout the workforce for green innovations that improve the company further.

In the green company identification process in this study, it is feasible that there are companies on the list that have met the requirements of the list but have not fully embraced sustainability in their business practices. For instance, there might well be a large corporation with a LEED certified professional on staff (putting them on the USGBC list) with no other thought toward sustainability. It is also plausible that there is a range of green-ness in companies. While one company might have a small division doing green work, another company can be wholly vested in sustainable practices in all facets of their operation. The companies selected for in depth study are evaluated by qualitative means to confirm their significant commitment to sustainable practices.

Once a contractor is identified as green, their public/private status needs to be checked. In order to achieve this, the company look-up utility within Yahoo Finance is used. Those companies that are publicly traded are in the database, and their ticker symbols and financials are available.

The other method employed was a comparison of the Dow Jones Sustainability Index for the U.S. (DJSI) and the Dow Jones Global Index for the U.S. (DJGI). The DJSI includes the top green companies in the U.S., two of which are in the construction industry. The DJGI includes all of the top companies in the U.S. irrespective of sustainability.

1.3.1. Independent Variable

The independent variable in this study is whether a company is green or not.

1.3.2. Dependent Variables

The dependent variables in this study are the company's profit margin, and Return on Net Worth, Return on Sales, Return on Assets, Price/Earnings, and Market cap/Sales ratios. These ratios are computed by using the last two years of financial data available for all of the companies in the study.

The dependent variables are all repeatable and easily understood. They are widely accepted as indicators of corporate economic success. They are also quantitative, and that allows close examination without undue subjectivity associated with qualitative variables.

The primary dependent variable is the **return on net worth** since it is the most inclusive ratio for profitability. It contains elements from both the balance sheet and the income statement, so it gives a more comprehensive look at a company. The value of the company is captured on the balance sheet, specifically the net worth. This measure also captures differences in cost of capital since that affects net profit on the income statement directly. If a company has a high level of debt, then the cost of their capital increases as lenders cover their risk in lending to a company with a large amount of existing debt. Net profit is calculated by subtracting expenses, including the cost of capital, from the company's revenue.

Profit margin is a dependent variable that assesses the ability of a company to generate net profit from sales. It includes the ability of the company to conduct its business effectively, and can be obscured by strategy decisions that impact net profits in the short term. Even with its drawbacks, profit margin is a useful variable to support the sought correlation between sustainability and economic bottom line.

Price to earning ratio was explored as a dependent variable to assess relative value placed in a company. The P/E ratio is tied directly to the growth of the company, and it is more difficult for a large company to grow by the same percentage as a smaller company. For a meaningful comparison, the companies need to be very close in overall size.

The ratio of **market cap to sales** shows the stock market's value in the company per dollar of annual revenue. This measure can be useful in identifying the market's valuation of businesses, and does not directly reflect the company's strategy and business decisions. This has the advantage of taking the market's response to a company and normalizing it with a top-line figure that is not so easily affected by company dynamics.

The dependent variable for comparing the DJSI with the DJGI is the value of each indexed to the inception of DJSI in 1998.

In order to give some context to the dependent variables, industry averages were sought for each ratio. The industry averages for the operating ratios were obtained from Dunn & Bradstreet's heavy construction figures. The averages for the remaining ratios were calculated for the heavy construction industry using publicly available data from Yahoo Finance. It is important to note that only three of the five study companies are in the heavy construction area of the industry, so comparing the averages to the heavy construction area gives some context but is not directly comparable.

1.3.3. Control Group

The study compares the dependent variables of the identified green contractors with a negative control group and the industry as a whole. The control group is employed to yield the most information possible from the small number of publicly traded green contractors. It is also helpful since the companies identified are somewhat diverse in their placement around the industry. The negative control group is made up of "sister" companies to each of the studied companies. The sister companies are selected based on the following criteria:

- ☐ Publicly traded
- ☐ Similar positioning in the industry
- ☐ Similar overall size
- ☐ Lack of green characterization

Table 1.1 Control Group Characteristics

CONTRACTOR	Industry Area	2005 Domestic Sales
Fluor	General Const, Heavy	13,161,050,000
Technip	General Const, Heavy	6,728,800,000
Turner	General Const, Heavy	7,000,000,000
Granite	General Const, Heavy	2,641,350,000
Skanska Usa	General Const, Heavy	4,200,000,000
Matrix Services	General Const, Heavy	439,140,000
Weyerhaeuser	Building products, timber	22,629,000,000
International Paper	Building products, timber	24,097,000,000
American Standard	Building materials, hvac	10,264,000,000
Watsco Inc	Building materials, hvac	1,682,720,000

1.3.4. Confounding Factors

The study companies represent different portions of the construction industry. The control group addresses this factor by allowing a comparison with close competitors in the industry for each of the studied green companies.

Some of the study companies are owned by international construction conglomerates. The concern is that the effect of the domestic sustainability focus is diluted in the financial reporting of the parent company. Methods of extracting the domestic financials were explored in the hope of being able to isolate the domestic policies and their impacts from the larger international operations, however only sales volumes were available. This assisted in the appropriate assignment of control group companies to the study group companies, but for ratio analysis, parent company figures were used.

The study companies are not pure plays in green construction. Since there are so few companies to study, it is necessary to include all shades of green in this sense. Some of the qualitative data provides an insight into how great of a part of the corporation's focus is on sustainability.

There is a risk associated with including companies that may have done enough to be identified in the study as green, but not have fully adopted sustainable policies and practices. A company in this position would not be expected to have as strong a financial effect as others. The correction for this confounding factor is the assessment of news stories about each company that indicate their sincerity and commitment to sustainable business practices. This allows distinction between the committed green company which has adopted the concepts throughout its business and the company which has isolated commitment to sustainability.

The length of time that a company has been committed to sustainable business would be expected to impact how pronounced of an effect being green is having on them. A company may initially see a cost in training professionals and adopting business practices in advance of the anticipated economic success increase. To account for this, each studied company is investigated to establish

an approximate length of time since they have become green. This allows any initial adoption impacts to be identified.

Changing corporate leadership can have a marked impact on a company's performance. To isolate the potential for this factor's impact on the study, each company is investigated to determine the length of time since their last change in corporate leadership.

1.4. Research Summary

The intended outcome of this study is an indication of the value of sustainability to a contractor's economic business success. To assess the differences between the different groups, statistical tools are employed such as average values and standard deviations. All of the differences identified are explored, regardless of statistical significance. It might well be that some areas of the industry see larger profit impacts from their green commitment to date. It might also be that there are other dynamics that can be inferred from the data such as the investment required to become green, and the impact that it has initially on the company's financials.

Business owners, who are under pressure to maintain economically viable companies, might be able to take the correlation between sustainability and profitability as a portion of the assurance that they need in order to move their companies toward sustainability.

CHAPTER 2. LITERATURE REVIEW

2.1. Background

Sustainability in construction dates back to at least the first century, when Vitruvius documented Rome's goals in their building programs. These goals included maximizing the enjoyment of the occupants, indoor air quality in order to protect the health of the occupants, and the use of local building materials [20]. These same goals remain today, and help to guide green business [2]. Vitruvius also recorded Rome's attention to the underlying principle of sustainability in construction when he described their approach as the "thrifty balancing of cost and common sense in the construction of works." [20]

2.2. Success in Business

Success in business is often thought of in financial terms, but this myopic view misses some key motivators. A more comprehensive set of measures for success exist in the triple bottom line factors of environmental, economic and social impacts of business [3-4]. The triple bottom line asserts that there is value created from being good stewards of the environment, and taking care of people in addition to the monetary aspect of a business. The benefits of attention to the triple bottom line manifest themselves in the effective management of risk, expense and benefit. It has been shown that efforts to improve on one of the areas of the triple bottom line often result in improvements in the other areas as well [1, 4-5, 10]. Monetary measures of business success include size, rate of return, rate of growth, added value, and profitability [7-8].

The benefits of sustainable construction can be observed across the three areas of the triple bottom line, but a company must have economic success in

order to continue to exist. A company with high environmental and social standards but low profits may be driven out of business [14].

2.3. Costs and Benefits of Sustainable Construction

The initial logical reaction of some people is that there must be a direct trade-off between the economic benefit and the social and environmental benefits, but there are actually synergies that exist between sustainability and constructability [1]. There are costs and benefits associated with green construction for both the owner and the contractor. Factors that can positively impact the financial bottom line of the contractor as a result of sustainable construction include: reduced operating costs, insurance premiums, and capital costs; enabled growth, and conserving capital [10]. Other benefits of sustainable construction include better brand reputation for the contractor, better working conditions for the builders and the occupants, and enhanced recruiting power [1, 6, 9]. The contractor costs of green construction lie primarily in the training and equipping of their workers.

Green building owners have more value in their facility than they would otherwise, and they are willing to pay more for the high performance and value than they would have been with a building constructed without a sustainability focus [1, 19]. One study showed that 67% of people are willing to pay more for green products and services [4]. This shows that people place value in commitment to sustainable business practices, and are willing to compensate those companies that provide goods and services in ways that support those ideas. This links owner benefit to contractor benefit. The owner costs associated with sustainable construction are typically manifested in higher priced materials and building systems, but buildings constructed with green principles have lower operational costs due to greater efficiency [1]. It has been estimated that a 2% additional investment in construction cost could yield a return of 10 times the investment over twenty years of use and operation [17].

2.4. Impact of Sustainable Construction on Business Success

The economic business case for sustainable construction is largely made in the reduction of operational risk and eco-efficiency [9]. Lower risk leads to a reduction in the insurance premiums, and that directly improves a company's profit position. Eco-efficiency has within it waste reduction, process improvements, and revenue generated from waste streams [11]. Focusing on comprehensive eco-efficiency, contractors can save as much as 10% of their costs [15]. Correlation has been shown between some social and environmental measure and financial bottom line in other industries, specifically the petroleum industry [5, 9]. Another primary impact of a company's commitment to sustainable business practices is their increase in market share [4]. In general, excellence in sustainability contributes to the key drivers that are recognized by the financial community [11]. This study endeavors to show the correlation between sustainable construction and the economic success of the contractors.

2.5. Measuring Economic Success

Economic success is often measured using key business ratios [13]. These ratios are standard in the financial community, and have been shown to have predictive value in business assessment [12]. There are business ratios in several areas including solvency, efficiency, and profitability. In publicly traded companies, success is measured by shareholder value, and that value is derived in part from the company's profitability [11]. There are three main business ratios that measure a company's profitability: return on net worth, return on assets, and return on sales. The most broad and inclusive ratio of the three is return on net worth, so that is the focus of this study.

CHAPTER 3. DATA COLLECTION

3.1. Construction Industry

According to Dunn & Bradstreet, 5893 companies make up the sector. This is the total of the standard industry classification (SIC)'s 15 and 16 at the end of 2004. SIC 15 represents general contractors in the building construction sector. SIC 16 represents the heavy construction portion of the sector. Together, they give a comprehensive group of contractors in the construction industry.

3.2. Locating Green Contractors

Numerous sources exist for the identification of green contractors, and they range from impartial and objective to economically driven. The sources identified are shown in Table 3.1 along with the contribution of each source to the list of green contractors.

Table 3.1 Green Contractor Sources

SOURCE	GREEN KTR'S
USGBC	128
DJSI	2
LEED KTR'S	
Greenbuilder.com	15
Company Claims	
TOTAL	145

The USGBC is a well respected source of certification and guidance in the area of green construction. They provide certification classes to industry professionals who desire formal association with green building. They also maintain a

database of all of the companies that are represented by the certified professionals that have gone through their courses of instruction. By going through the entire list of certified professionals, and noting which company each one worked for, 128 green contractors were identified. The DJSI U.S. represents all of the leading sustainability minded companies in the U.S. as judged by Dow Jones and the sustainable asset management group. Within the index are several industry sectors, one of which being construction. Two green contractors were identified by their presence in this sector. The final successful source of green contractor identification was the business listing section of Greenbuilder.com. Greenbuilder is a web site that includes a directory area where companies can elect to be listed as a provider of green construction services. There were 15 green contractors who had elected to be listed in the directory. The level of commitment to sustainable construction and business practices of these 15 companies is suspect since they did not appear on the aforementioned areas, but at least they desire to be associated with the green building industry, so there is some commitment. The LEED program has certified a number of projects since its inception, and another source of contractor identification would be those that have completed a LEED certified project. Unfortunately, the USGBC is currently unable to provide contractor information on LEED projects, only owner information. The last considered source was direct company claims. As seen on Greenbuilder, some companies use their ability to offer green construction in their advertising. The level of commitment is dubious in this instance, so no contractors were included who did not meet the requirements of one of the other areas.

3.3. Locating Public Contractors

To identify publicly traded companies within the construction industry, Yahoo Finance was used. A search was performed as broadly as possible for the construction industry, and 72 publicly traded contractors were identified. Since Yahoo Finance would be the same database used to determine the

financial data, it was a good source for a comprehensive list of publicly traded contractors. Figure 3.1 shows the large construction industry, with the small subsets of publicly traded companies and green companies. The study group consists of the five companies in the overlap of the three sets.

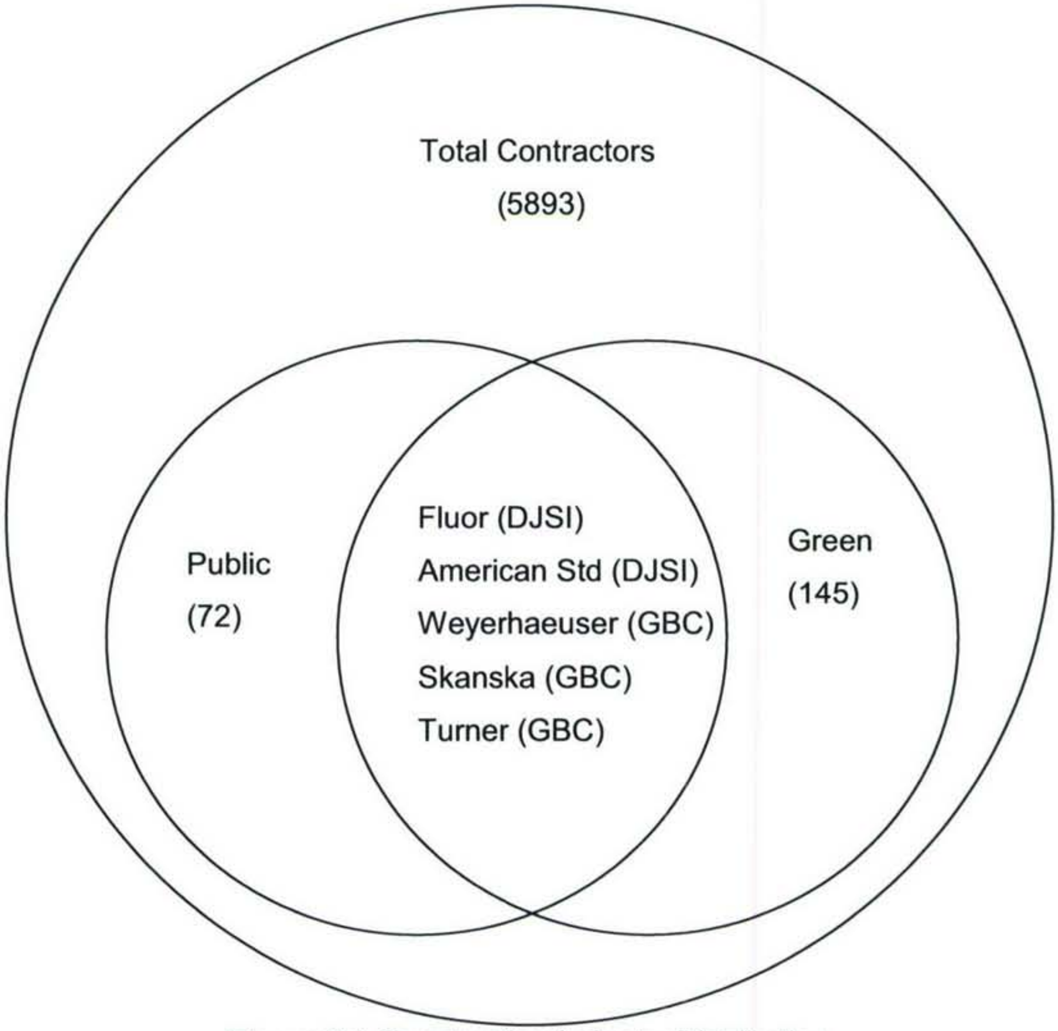

Figure 3.1 Construction Industry Distribution

3.4. <u>Study Group</u>

The five publicly traded green contractors that were identified above are: Skanska USA, Turner Construction, Weyerhaeuser Company, Fluor Corporation, and American Standard Companies. Company biographical sketch sheets can

be found in appendix E. As a group, they represent three areas within the construction industry. Fluor, Turner and Skanska offer main-line general construction services, and are listed above in descending order of domestic sales volumes in 2005. Weyerhaeuser represents the timber related building material area and has a large sales volume. American Standard represents HVAC and plumbing fixtures primarily and also has a large sales volume.

3.5. Negative Control Group Selection

The publicly traded companies that share the area within the construction industry with the study group companies were reviewed for sales volume and level of apparent commitment to sustainable construction. Since all of the study companies have large sales volumes compared to most of the industry, the control group companies were reviewed from the largest in each area. Each company that appeared by its profile on Yahoo Finance, its company website claims, and recent new releases to be associating themselves with or touting their prowess in green building were eliminated from consideration. The resulting non-green companies were then selected based on sales volume to best match each of the study companies.

The negative control group is made up of the following companies: Technip, Granite Construction, Matrix Services, the International Paper Company, and Watsco Inc. Technip, Granite, and Matrix are all main-line construction firms without strong green claims. They are listed in descending order of their domestic sales volume, and they were paired with the first three study group companies by their volume. International Paper is building material producer focused on timber related products. As the non-green company in this area with the closest level of sales with Weyerhaeuser, they were a suitable pair. Watsco is a building material producer focused on HVAC. Their sales volume ($2 billion) is well below American Standard's ($10 billion), but the only larger company in this area is Owens Corning, who is struggling to get out of bankruptcy currently, so they were dropped from consideration. Table 3.2 shows

each of the control group companies with their key statistics next to their sister study group companies.

3.6. Financial Data

For each study and control group company, the following data was collected by accessing their balance sheets and income statements on Yahoo Finance [26]:

- ☐ Net Profit (EOY 2004, 2005)
- ☐ Profit Before Taxes (EOY 2004, 2005)
- ☐ Sales (EOY 2004, 2005)
- ☐ Total Assets (EOY 2004, 2005)
- ☐ Total Liabilities (EOY 2004, 2005)
- ☐ P/E Multiple (ttm as of 6/2/2006)
- ☐ Number of shares outstanding (daily 2004, 2005)
- ☐ Closing share price (daily 2004, 2005)

The data is represented in Appendices A and B for the study group and control group respectively. Daily share information was utilized in order to rule out any data anomalies that could exist if isolated dates were selected for analysis. Taking daily data and observing the trends is most illuminative in areas where that level of data is available. Domestic sales volumes were obtained for Skanska and Turner on their web sites, but the other data was not available for their domestic operations, so the ratios were computed using their parent companies' data.

Industry average ratios were obtained from Dunn & Bradstreet, with their latest figures reflecting end of year 2004.

3.7. Business Data

For each study and control group company, the following data was collected from their web sites:

- Date the company became green
- Number of positive green news items in 2005
- Date of the last CEO change

The raw data can be seen in Appendices A and B for the study group and control group respectively. The green date was obtained by reviewing each company's history and press release archive on their web sites. The earliest identifiable action on their part to publicly claim adherence to sustainable business practices was taken as their "green" date. The number of positive green news items for each company was taken as the summation of positive green news stories in 2005 available on Google Finance [27] as well as each company's press release archive on their web site. Positive green news was taken as an article that promoted sustainable business principles across the entire triple bottom line. The CEO change data was obtained from Google Finance's profile of each company [27].

3.8. Dow Jones Index Data

To facilitate the comparison of Dow Jones Sustainability Index for the U.S. and the Dow Jones Global Index for the U.S., index values were obtained going back to the inception of DJSI. The values were indexed to their 1998 levels in order to effectively compare the figures. The resulting chart was taken from the DJSI web page on 6/2/2006, and can be seen in Figure 3.2.

Figure 3.2 DJSI vs DJGI Comparison

In order to be included in the sustainability index, companies are graded on the criteria listed in Table 3.3 using publicly available information. Going through this process has resulted in the inclusion of the companies in Table 3.4.

Table 3.3 DJSI Selection Criteria

Dimension	Criteria
Economic	Codes of Conduct / Compliance / Corruption&Bribery
	Corporate Governance
	Customer Relationship Management
	Investor Relations
	Risk & Crisis Management
Environment	Environmental Policy / Management
	Environmental Performance (Eco-Efficiency)
	Environmental Reporting
Social	Corporate Citizenship/ Philanthropy
	Stakeholders Engagement
	Labor Practice Indicators
	Human Capital Development
	Social Reporting
	Talent Attraction & Retention

Table 3.4 DJSI Membership

Company	Super Sector
Ford Motor Co.	Automobiles & Parts
Johnson Controls Inc.	Automobiles & Parts
Bank of America Corp.	Banks
Citigroup Inc.	Banks
Weyerhaeuser Co.	Basic Resources
Air Products & Chemicals Inc.	Chemicals
E.I. DuPont de Nemours & Co.	Chemicals
Praxair Inc.	Chemicals
American Standard Cos. Inc.	Construction & Materials
Fluor Corp.	Construction & Materials
Bear Stearns Cos.	Financial Services
Chicago Mercantile Exchange Holdings Inc.	Financial Services
Equity Office Properties Trust	Financial Services
Goldman Sachs Group Inc.	Financial Services
Merrill Lynch & Co. Inc.	Financial Services
Coca-Cola Co.	Food & Beverage
General Mills Inc.	Food & Beverage
H.J. Heinz Co.	Food & Beverage
Kraft Foods Inc.	Food & Beverage
Sara Lee Corp.	Food & Beverage
Abbott Laboratories	Health Care
Aetna Inc.	Health Care
Allergan Inc.	Health Care
Baxter International Inc.	Health Care
Becton, Dickinson & Co.	Health Care
Bristol-Myers Squibb Co.	Health Care
Genzyme Corp.	Health Care
Guidant Corp.	Health Care
Johnson & Johnson	Health Care
Pfizer Inc.	Health Care
Quest Diagnostics Inc.	Health Care
UnitedHealth Group Inc.	Health Care
3M Co.	Industrial Goods & Services
Accenture Ltd.	Industrial Goods & Services
Agilent Technologies Inc.	Industrial Goods & Services
Caterpillar Inc.	Industrial Goods & Services
Cooper Industries Inc	Industrial Goods & Services
General Electric Co.	Industrial Goods & Services
MeadWestvaco Corp.	Industrial Goods & Services
R.R. Donnelley & Sons Co.	Industrial Goods & Services
Rockwell Collins Inc.	Industrial Goods & Services
United Parcel Service Inc.	Industrial Goods & Services
United Technologies Corp.	Industrial Goods & Services
Waste Management Inc.	Industrial Goods & Services
Allstate Corp.	Insurance

Table 3.4 DJSI Membership (Cont'd)

Company	**Super Sector**
Comcast Corp.	Media
Gannett Co. Inc	Media
New York Times Co.	Media
Time Warner Inc.	Media
Walt Disney Co.	Media
Chevron Corp.	Oil & Gas
Noble Corp.	Oil & Gas
Schlumberger Ltd.	Oil & Gas
Eastman Kodak Co.	Personal & Household Goods
Georgia-Pacific Corp.	Personal & Household Goods
Kimberly-Clark Corp.	Personal & Household Goods
Nike Inc.	Personal & Household Goods
Procter & Gamble Co.	Personal & Household Goods
Pulte Homes Inc.	Personal & Household Goods
Whirlpool Corp.	Personal & Household Goods
Federated Department Stores Inc.	Retail
Gap Inc.	Retail
H&R Block Inc.	Retail
Limited Brands Inc.	Retail
Lowe's Cos.	Retail
Office Depot Inc.	Retail
Staples Inc.	Retail
Target Corp.	Retail
Walgreen Co.	Retail
Whole Foods Market Inc.	Retail
Adobe Systems Inc.	Technology
Advanced Micro Devices Inc.	Technology
American Power Conversion Corp.	Technology
Applied Materials Inc.	Technology
Cisco Systems Inc.	Technology
Computer Associates International Inc.	Technology
Dell Inc.	Technology
Hewlett-Packard Co.	Technology
Intel Corp.	Technology
International Business Machines Corp.	Technology
Microsoft Corp.	Technology
Motorola Inc.	Technology
Texas Instruments Inc.	Technology
Harrah's Entertainment Inc.	Travel & Leisure
McDonald's Corp.	Travel & Leisure
Starbucks Corp.	Travel & Leisure
Cinergy Corp.	Utilities
Constellation Energy Group Inc.	Utilities
Duke Energy Corp.	Utilities
Entergy Corp.	Utilities
FPL Group Inc.	Utilities
Pinnacle West Capital Corp.	Utilities
Progress Energy Inc.	Utilities

3.9. Contractor Survey Data

A five question survey was developed, and sent to ninety six construction contractors. The survey was conducted online using SurveyMonkey.com, and the respondents were solicited with an email requesting that they follow a provided link to the survey. The questions and data are represented in Appendix D. The intent of the survey was to assess the perceived value of green construction to contractors. The data collected includes how many of the surveyed contractors consider themselves green; how much value they think building owners place in the various benefits of green buildings and contractors; what the surveyed contractors see influencing their reputations; and what advantages the contractors see in being green.

3.10. Data Summary

There are two limitations noted in the data collected for this study with these procedures. The first limitation is that Dunn & Bradstreet's data for the end of year 2005 was not available for inclusion in this study. Their 2004 industry data was used for some comparison, but having the industry comparisons for both years would be very helpful to identify trends in the industry that might also be present in the company trends studied.

The second limitation is that the P/E data found was incomplete. Different standards were considered, including the forward projection and the 5 year high, but the trailing twelve month standard was found to have the most data coverage for the two groups. Different sources were also investigated, including Yahoo Finance, Google Finance, MSN Money, Reuters and Hoovers. The most complete of all the data sets found was the ttm measure, but it was missing three of the ten values, so a thorough analysis is impossible.

CHAPTER 4. DATA ANALYSIS

4.1. Business Data Analysis

In comparing the economic success of the study group companies and the control group companies, it is important to inspect each company's level of experience with sustainable construction, commitment to sustainable business practices, and other primary factors could be influencing their economic figures.

4.1.1. Green Experience

A company that is new to sustainable construction would not have yet reaped the economic benefits of their new business practices. Each of the study group companies adopted sustainable construction practices at least four years ago, with Weyerhaeuser having 35 years of experience. By definition, the control group companies have zero years of experience in sustainable construction. Given the experience of the companies in the study group, it is expected that the financial effects of their commitment to sustainable construction should be observable in the last two years' data. Table 4.1 shows the date that each study company became green and the rationale behind that assessment.

Table 4.1 Study Company Green Dates

CONTRACTOR	Date they became green	Rationale for date
Fluor Corporation	February 1999	Published Strategic Direction
Turner Construction	September 2002	Started Award Program
Skanska Usa	October 2002	Company Inception
Weyerhaeuser	January 1971	Published Env. Policy
American Standard Companies Inc	December 2000	Announced Corp. Change

4.1.2. Green Commitment

The degree to which a company is committed to sustainable business practices is the degree to which the financial effects of their sustainability would be manifested. To address the level of commitment, a measure of green news story volume was used. The study companies had an average of nearly 24 green news stories in 2005. The control group had only 3 green news stories on average in 2005. The level of commitment to sustainable practices exhibited by the study group was far more than that of the control group. The closest margin for a pairing was between Turner with 16 green news stories and Granite with 5 green news stories. Even the closest margin shows a distinct difference in commitment, so the expectation that the difference in economic figures would be noticeable is bolstered. Table 4.2 shows the number of green news stories for each company during 2005 as well as the number of those stories that were published outside of the company by third party outlets.

Table 4.2 Company Green Commitment

CONTRACTOR	Total Green News Items (2005)	Third Party Green News Items (2005)
Fluor Corporation	18	1
Technip	3	0
Turner Construction	16	2
Granite Construction	5	1
Skanska Usa	27	2
Matrix Services	0	0
Weyerhaeuser	37	4
International Paper Co.	6	1
American Standard	19	2
Watsco Inc	1	0

4.1.3. Company Leadership Dynamics

Both the study group and the control group had a similar range of leadership change dynamics. Each group had a company with a recent CEO change while all of the other companies have had stable leadership over the last several years. Since this dimension is largely similar, it is not expected to have a notable impact on the quantitative data collected. Table 4.3 shows the time since the most recent CEO change for each company.

Table 4.3 Company Leadership Change

CONTRACTOR	Time since last CEO change
Fluor Corporation	4 years
Technip	5 years
Turner Construction	8 years
Granite Construction	19 years
Skanska Usa	1 year
Matrix Services	1 year
Weyerhaeuser	9 years
International Paper Co.	7 years
American Standard Con	6 years
Watsco Inc	33 years

4.2. Business Ratio Comparison

The business ratios are broken into two categories: operating profitability ratios, and market value ratios. The operating profitability ratios are return on net worth, return on sales, net profit margin, and return on assets. These ratios reflect how well the company generates profit. The market value ratios are price to earnings, and market cap to sales. These ratios reflect the value that the market places on a company. The market is driven by more than historical figures, and includes value based on projections, perceived risk and a number of

qualitative measures. The two categories allow an investigation into both how well the companies operate and how well the market rewards them.

Return on Net Worth was calculated by taking the net profit after tax divided by the net worth. Net worth is the difference between total assets and total liabilities. Figure 4.1 shows the average return on net worth for the study group, the control group, and the industry average for two years, plus or minus one standard deviation. Table 4.4 shows the company pair figures for 2004 and 2005.

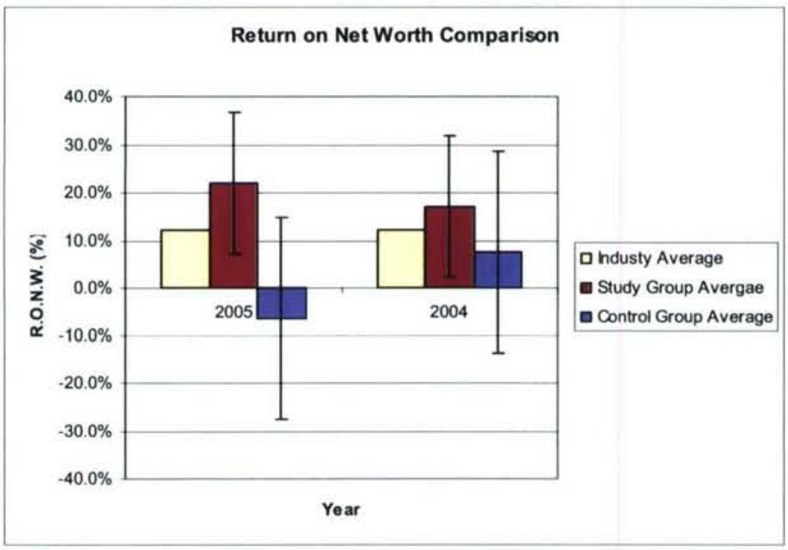

Figure 4.1 Return on Net Worth Comparison

Table 4.4 Return on Net Worth Data

CONTRACTOR	2004 RONW	2005 RONW
Fluor Corporation	14.0%	13.9%
Technip	4.1%	6.6%
Turner Construction	4.3%	6.6%
Granite Construction	10.4%	13.4%
Skanska Usa	19.5%	20.9%
Matrix Services	11.1%	-80.9%
Weyerhaeuser	13.9%	7.5%
International Paper Co.	-0.4%	13.2%
American Standard Con	33.7%	60.4%
Watsco Inc	11.9%	15.5%

Return on Sales was calculated by taking the profit before taxes divided by the sales. Figure 4.2 shows the average return on sales for the two groups and the industry for the last two years, plus or minus one standard deviation. Table 4.5 shows the company pair figures for 2004 and 2005.

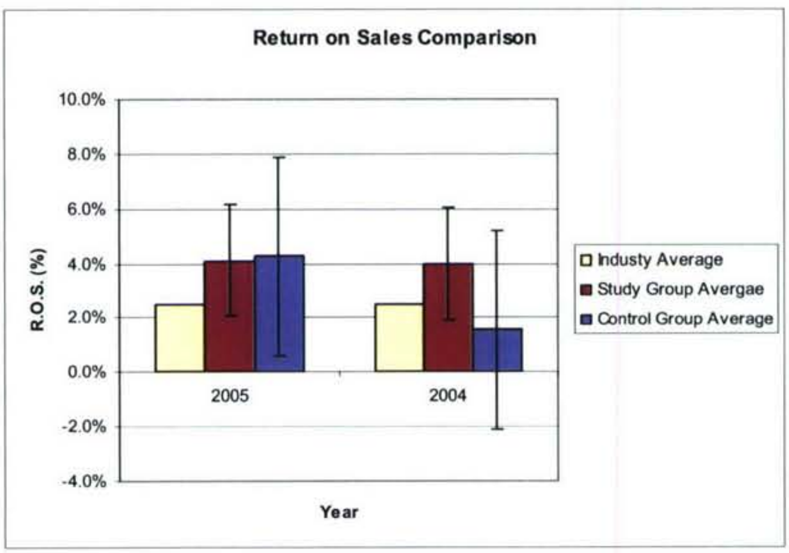

Figure 4.2 Return on Sales Comparison

Table 4.5 Return on Sales Data

CONTRACTOR	2004 ROS	2005 ROS
Fluor Corporation	3.0%	2.3%
Technip	5.3%	3.3%
Turner Construction	1.6%	2.4%
Granite Construction	4.4%	5.4%
Skanska Usa	3.6%	4.1%
Matrix Services	2.6%	-10.1%
Weyerhaeuser	8.6%	4.0%
International Paper Co.	2.9%	2.4%
American Standard Cor	3.8%	7.1%
Watsco Inc	5.9%	6.7%

Return on Assets was calculated by taking the net profit divided by the total assets. Figure 4.3 shows the average return on assets for the two groups and the industry for the last two years, plus or minus one standard deviation. Table 4.6 shows the company pair figures for 2004 and 2005.

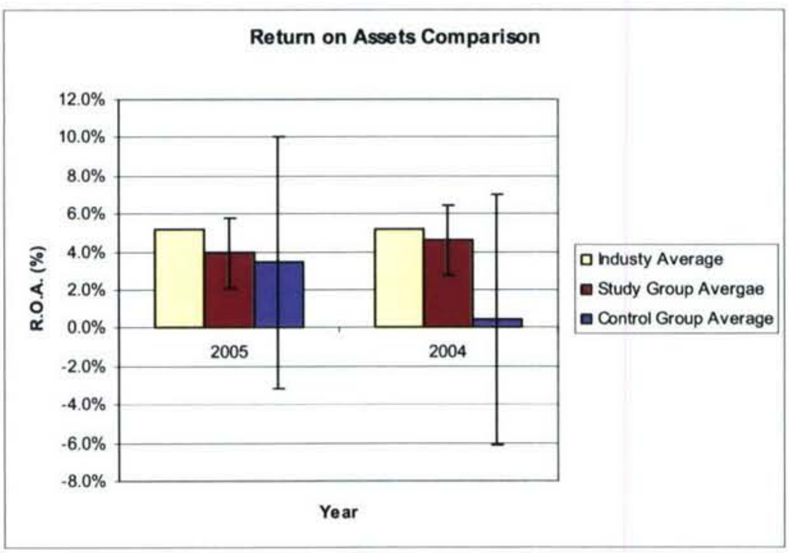

Figure 4.3 Return on Assets Comparison

Table 4.6 Return on Assets Data

CONTRACTOR	2004 ROA	2005 ROA
Fluor Corporation	4.7%	5.0%
Technip	0.6%	1.8%
Turner Construction	1.1%	1.9%
Granite Construction	4.5%	5.6%
Skanska Usa	5.1%	5.5%
Matrix Services	4.3%	-19.2%
Weyerhaeuser	4.3%	2.6%
International Paper Co.	-0.1%	3.8%
American Standard Cor	4.6%	8.1%
Watsco Inc	7.9%	10.3%

Another interesting representation of the data is across measures within the study and control groups respectively. This allows a comparison over time and across companies of multiple measures. Figure 4.4 shows the three operating ratios for each of the study companies in 2004 and 2005. Figure 4.5 shows the same things for the control group.

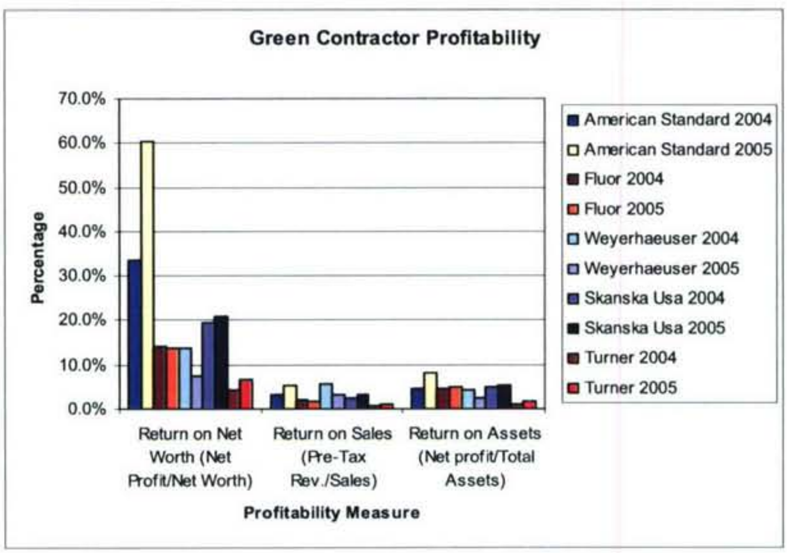

Figure 4.4 Study Group Ratio Comparison

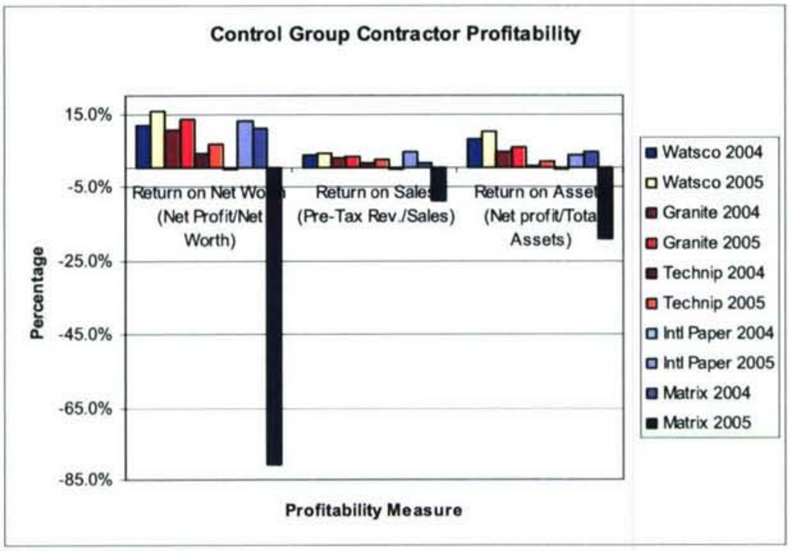

Figure 4.5 Control Group Ratio Comparison

4.3. Net Profit Margin Comparison

The Profit Margin was calculated by taking the net profit divided by sales. Figure 4.6 shows the average net profit values for the study group, the control group, and the industry average for two years, plus or minus one standard deviation. Table 4.7 shows the company pair figures for 2004 and 2005.

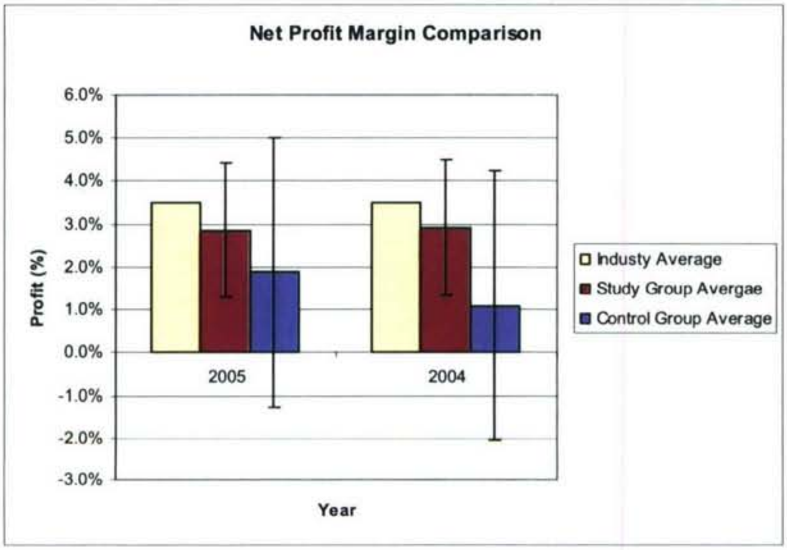

Figure 4.6 Net Profit Margin Comparison

Table 4.7 Net Profit Margin Data

CONTRACTOR	2004 Profit Margin	2005 Profit Margin
Fluor Corporation	2.0%	1.7%
Technip	1.6%	2.4%
Turner Construction	0.7%	1.1%
Granite Construction	2.7%	3.1%
Skanska Usa	2.6%	3.1%
Matrix Services	1.6%	-8.8%
Weyerhaeuser	5.7%	3.2%
International Paper Co.	-0.1%	4.6%
American Standard Con	3.3%	5.4%
Watsco Inc	3.7%	4.2%

4.4. Price/Earnings Comparison

The P/E analysis was inconclusive, and that is attributed to the fact that the company pairs between the study group and the control group have large size differentials even though they were paired as closely as they could be. Any impacts of their sustainability on their P/E are obscured by the dynamics of

company size and growth potential. If company pairs could be identified with very similar size, this comparison could be illuminative of the value placed in a green contractor over the control group contractor. The data collected for the trailing twelve month P/E ratio for each company and their respective sales volumes can be seen in Table 4.8.

Table 4.8 P/E Data

CONTRACTOR	2005 Domestic Sales	P/E (ttm as of 6/2/2006)
Fluor Corporation	13,161,050,000	29.31
Technip	6,728,800,000	54.82
Turner Construction	7,000,000,000	N/A
Granite Construction	2,641,350,000	19.94
Skanska Usa	4,200,000,000	N/A
Matrix Services	439,140,000	183.18
Weyerhaeuser	22,629,000,000	N/A
International Paper Co.	24,097,000,000	21.03
American Standard Con	10,264,000,000	17.84
Watsco Inc	1,682,720,000	22.09

4.5. Market Cap/Sales Comparison

The Market Cap/Sales ratio was calculated by taking the market cap divided by annual sales. Market cap is calculated as the daily closing share price times the number of shares outstanding. The ratio was taken using daily data to produce the most accurate results possible. Once the daily values were obtained, they were averaged for each year to obtain comparison figures. Figure 4.7 shows the average daily values for the study group, the control group, and the industry average for two years, plus or minus one standard deviation.

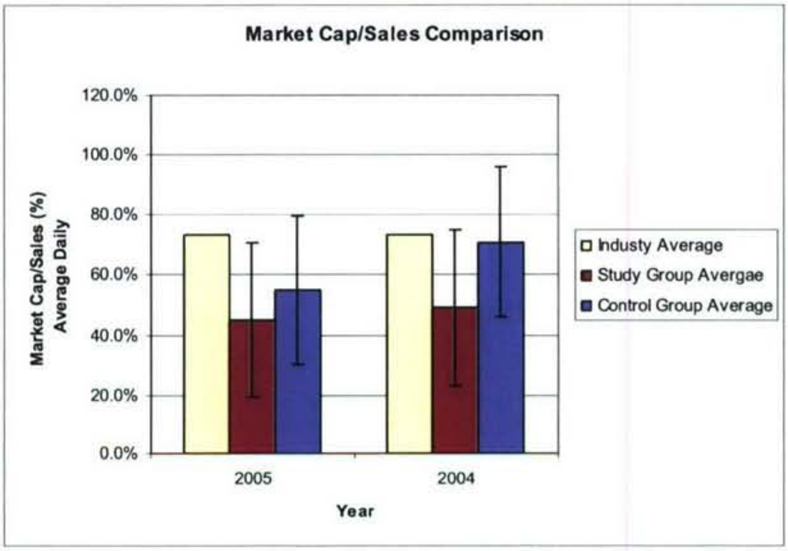

Figure 4.7 Market Cap/Sales Comparison

A final way to look at the investigations is in a direct pair-wise comparison. Figure 4.8 shows each company pair's ratios for both years.

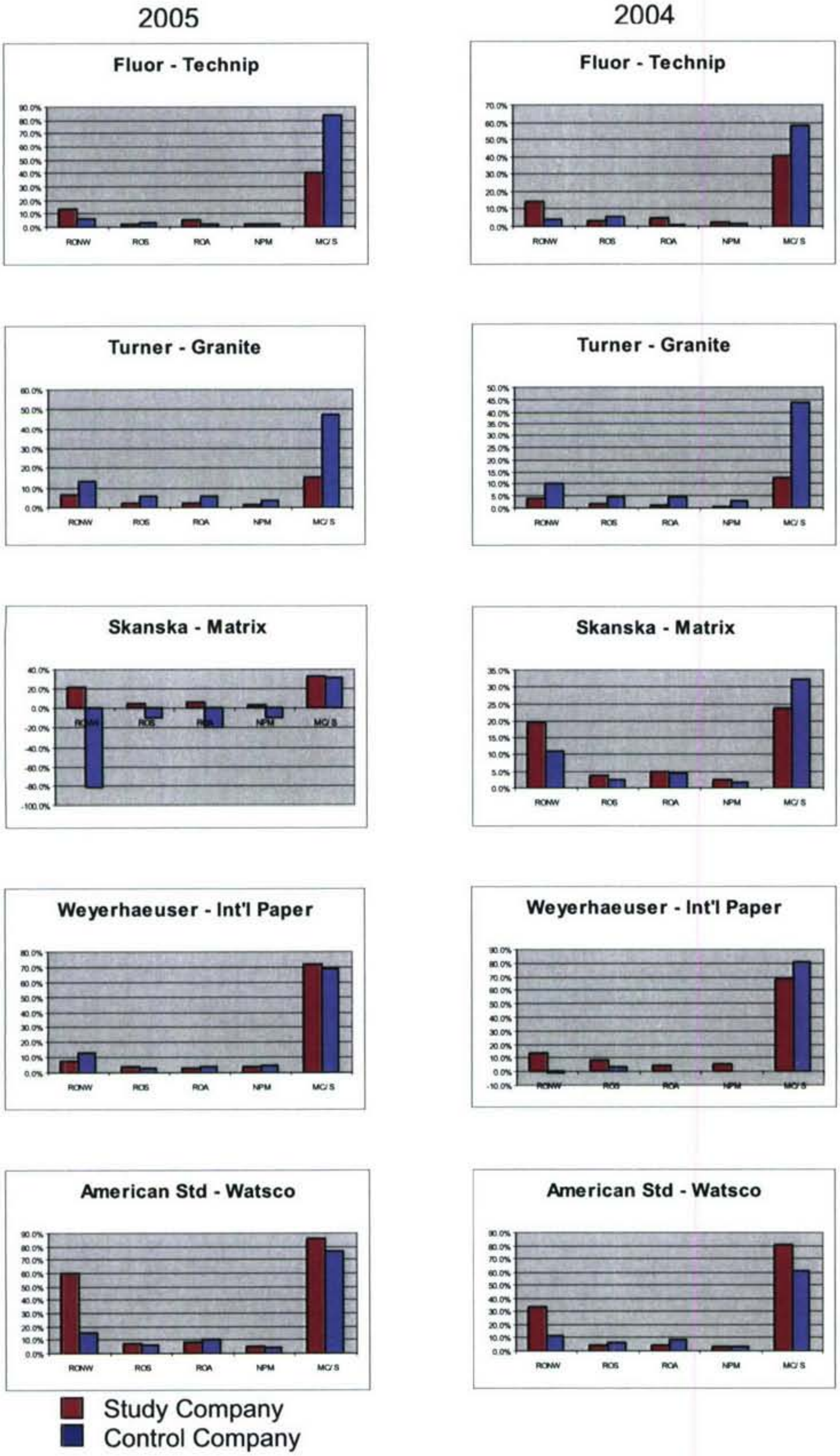

Figure 4.8 Pair-Wise Ratio Comparison

4.6. Contractor Survey

Of the ninety-six contractors who received the survey, twenty six responded. Once the raw data was collected, analysis was conducted for each question to determine the group's collective messages. For some questions, the analysis consisted of the percentage of respondents choosing each answer. The rest of the questions were analyzed based on the average numeric score given by the respondents in order to arrive at a ranking of possible answers. Once the averages were obtained, the answers were then sorted to represent the strongest to weakest responses. The strongest responses were considered to be larger increases in project cost tolerance, the most impact on reputation, and the top advantage of being a green contractor. The full contractor survey questions can be seen in Appendix D. The survey data with 26 responses is represented in Figure 4.9.

Question 1

Would you characterize your company as "Green"? This can manifest itself in offering green construction services as well as using green-minded business strategies.

Characterizations	Percentage of Respondents
Yes, in services offered, but not in business strategy	38.5%
Yes, in both services offered and business strategy	30.8%
No, not in either services offered or business strategy	23.1%
Yes, in business strategy, but not in services offered	7.7%

Question 2

In your experience and estimation, how much of an increase in project cost are owners willing to accept in order to get each of the following green building benefits?

Benefits	Average Score
Energy cost savings from building systems	2.68
Better building environment in terms of light and air quality	2.08
Water cost savings from efficient landscaping	2.00
Enhanced reputation from owning a green building	1.80

Question 3

How much of a premium are owners willing to pay for a contractor with excellent name recognition and reputation?

Answers	Percentage of Respondents
Small premium	69.6%
No premium	26.1%
Substantial premium	4.3%

Question 4

Rank the following factors by how much they impact a company's reputation.

Factor	Average Score
Past performance	1.22
Services offered	2.36
Friendly and helpful staff	2.43
Marketing efforts	3.48
Sales volume	3.74

Question 5

What would be the top three advantages of being a green contractor?

Advantages	Average Score
Improved reputation and brand name	1.53
Increased profit margin on green contracts	1.85
Increased market share and sales volume	1.94
Increased recruiting strength	2.00
Reduced workplace hazards and insurance costs	2.15
Better company culture and climate	2.38
Increased contract size on green projects	2.50
Cost savings from waste management	2.55

Figure 4.9 Contractor Survey Results

CHAPTER 5. RECOMMENDATIONS AND CONCLUSIONS

5.1. Results and Findings

For the companies studied, there is little evidence to support the hypothesis that green contractors have an economic disadvantage over the rest of the industry. In fact, there exist some correlations between positive business results and sustainable construction, and there are a couple of investigative methods that didn't show a positive correlation.

The Return on Net Worth investigation shows that the study contractors generate more profit per dollar of net worth than the control group and the industry average. This gives a good indication that there is in fact a positive correlation present, and that the study group companies are able to achieve better returns on the money invested in them by their owners. This is reinforced by the survey results that show that building owners are willing to pay a premium for green contractors and services. Green contractors with enhanced reputations performing green projects reap the benefits of those premiums in their profit.

The Return on Sales investigation shows that the study contractors generate more pre-tax revenue per dollar of sales than the industry average, and that the control group caught up with them in 2005. This indicates a possible correlation, and shows that the study companies have more efficient businesses than the industry, but that the gap might be closing with the control group over time, although it is hard to identify trends with only two years of data. The fact that study contractors tend to generate more pre-tax revenue can also be seen in the survey results that showed that one of the main benefits of being a green contractor was increased market share. Further, the return on sales advantage for the study group relative to the control group is notably smaller than the return on net worth advantage which indicates that the study companies likely use more leverage and carry more debt relative to the control group.

The Return on Assets investigation shows that the study contractors generate more profit per dollar of total company assets than the control group, but less than the industry average. This indicates that there may be a correlation, but it is masked by the fact that both groups are below the industry average. It appears that both groups struggle with efficiently using their assets to generate profit as compared to their industry peers, but that the study group was better at it than the control group.

Similarly, the Profit Margin investigation shows the same relationship with the study group outperforming the control group, but both groups lagging the industry average. This indicates that there is a correlation between the study group and higher profit, but that the industry on average is likely to earn higher profit still than either of the groups. The survey results also indicate that contractors expect that green companies will have higher profit margins on their green projects. There is the possibility that the study group has lower than expected profit margin due to the relatively small portion of their overall business that is represented by green projects. No direct measure of this was assessed in this study, but it might merit follow-on work.

The comparison of DJSI and DJGI shows marked superior performance of the top green companies across industries over time as compared with the top companies in general. While this investigation is not tied exclusively to the construction industry, it does show a positive correlation between green companies and economic business success. This helps round out the assertion that there is a correlation that is worth exploring.

The Market Cap/Sales investigation shows that the market is not rewarding the study group companies with market cap relative to the control group. In fact, there is a negative correlation showing that the control group is valued more highly by the market than the study group. The market is apparently more concerned about other factors such as company growth in imparting value to a company, and that masks the value that they see in green business. The other possibility, which seems unlikely, is that the market actually sees greater

value in not conducting green construction. This seems unlikely given the other indicators of success for the study companies over the control group. It is plausible that the impact of green business on value is simply overshadowed by the other factors considered, masking the value inherent with green construction.

The contractor survey showed that nearly 70% of the respondents offer green construction services, while just less than 40% consider their business strategies to be based on green principles. This was surprising in that it showed a far larger proportion of contractors being green than the public sector distribution discovered in the study. The respondents assess that owners get the most value by the energy savings of a green building, and place very little value in the enhanced reputation of owning a green building. The life cycle cost approach has apparently been effective in showing building owners that investing more up front can more than repay over time with reduces utility bills. Nearly 75% of the respondents consider owners willing to pay a premium to hire a contractor with higher brand reputation, and they consider the biggest advantage of being a green contractor as the extent to which it improves the company's reputation. The finding that contractors see the least of the advantages as the cost savings from waste management reinforces the hypothesis that green companies are at an economic disadvantage relative to the rest of the industry.

5.2. Recommendations

This study has demonstrated that the green contractors in the study group have not sacrificed value in becoming a green contractor as compared to the control group companies. Managing a company to the triple bottom line might include pursuits for the environmental and social areas that hurt the economic area, but in the case of the studied contractors, all of their pursuits in the non-economic areas have not resulted in their economic decline. The survey shows that the industry perception is that the largest impact is in offering the services, so future effort should be directed to validate the business impact of the strategy component. Isolating the services offered from the business strategies with such

a small data set will be quantitatively difficult. In order to advance the knowledge, it is important to formulate methods of investigation that enable the inclusion of privately held companies. This will enable much larger pools of data to be available, and will support more sharply focused investigations.

The framework of a price/value map can begin to be seen in the results of the contractor survey. To develop a relationship between each green service and the price that the owners are willing to pay for that service would be a great value in developing business strategy. Surveys of owners would be a likely extension of that effort, and a careful construction of the distinct and divisible green construction services would be necessary.

Another extension to this study would be to repeat it with 2005 industry data and larger groups of companies if they were to become available. Extending the study with more years of data would also allow for better visibility of the persistence of the results identified.

5.3. Limitations

The results of this study are limited in a couple of areas. Foremost, since the study group is so small, the results of this study are restricted to that group and any connections to the entire industry are tenuous. Also, the study group includes two companies within the construction industry, but clearly not building contractors, so the results of this study should not be imparted directly onto construction contractors.

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Appendix A.

Table A.1 Study Companies' Quantitative Data

	2004 (USD)					
GREEN CONTRACTOR	Net Profit	Sales	Total Assets	Total Liabilities	Net Worth (TA - TL)	Average Market Cap/Sales
Skanska Usa Building Inc	481,268,882	18,317,673,716	9,528,851,964	7,056,344,411	2,472,507,553	0.24
Turner Construction	100,608,620	14,835,424,171	9,048,565,396	6,682,399,702	2,366,165,694	0.12
Weyerhaeuser Company	1,283,000,000	22,665,000,000	29,954,000,000	20,699,000,000	9,255,000,000	0.69
Fluor Corporation	186,695,000	9,380,277,000	3,969,557,000	2,633,765,000	1,335,792,000	0.40
American Standard Companies Inc	313,400,000	9,508,800,000	6,841,800,000	5,911,500,000	930,300,000	0.80
	2005 (USD)					
GREEN CONTRACTOR	Net Profit	Sales	Total Assets	Total Liabilities	Net Worth (TA TL)	Average Market Cap/Sales
Skanska Usa Building Inc	587,613,293	18,831,873,112	10,772,054,381	7,964,350,453	2,807,703,927	0.33
Turner Construction	187,554,341	16,958,141,846	10,055,893,678	7,211,526,518	2,844,367,159	0.15
Weyerhaeuser Company	733,000,000	22,629,000,000	28,229,000,000	18,429,000,000	9,800,000,000	0.72
Fluor Corporation	227,270,000	13,161,050,000	4,574,440,000	2,943,890,000	1,630,550,000	0.40
American Standard Companies Inc	556,000,000	10,264,000,000	6,866,000,000	5,945,000,000	921,000,000	0.86

Table A.2 Study Companies' Qualitative Data

GREEN CONTRACTOR	Identifying Source	Green Date	Green Date Basis	Green News Items (2005)	Time since last CEO change
Skanska Usa Building Inc	USGBC	Oct-02	Inception	27	1 yr
Turner Construction	USGBC	Sep-02	Award Program	16	8 yr
Weyerhaeuser Company	USGBC	Jan-71	Env. Policy	37	9 yr
Fluor Corporation	DJ Sust Index	Feb-99	Strategic Direction	18	4 yr
American Standard Companies Inc	DJ Sust Index	Dec-00	Change Announcement	19	6 yr

Table A.3 Study Companies' Ratios

	2004			2005			
GREEN CONTRACTOR	Return on Net Worth (Net Profit/Net Worth)	Return on Sales (Net profit/Sales)	Return on Assets (Net profit/Total Assets)	Return on Net Worth (Net Profit/Net Worth)	Return on Sales (Net profit/Sales)	Return on Assets (Net profit/Total Assets)	P/E (ttm as of 6/2/2006)
Skanska Usa Building Inc	19.5%	2.6%	5.1%	20.9%	3.1%	5.5%	N/A
Turner Construction	4.3%	0.7%	1.1%	6.6%	1.1%	1.9%	N/A
Weyerhaeuser Company	13.9%	5.7%	4.3%	7.5%	3.2%	2.6%	N/A
Fluor Corporation	14.0%	2.0%	4.7%	13.9%	1.7%	5.0%	29.31
American Standard Companies Inc	33.7%	3.3%	4.6%	60.4%	5.4%	8.1%	17.84

Appendix B.

Table B.1 Control Group Quantitative Data

CONTRACTOR	2004 (USD) Net Profit	Sales	Total Assets	Total Liabilities	Net Worth (TA TL)	Average Market Cap/Sales
Technip	113,655,000	7,014,380,000	17,787,683,000	14,986,842,000	2,800,841,000	0.58
Granite Construction	57,007,000	2,136,212,000	1,277,954,000	727,480,000	550,474,000	0.44
Matrix Services	9,542,000	608,761,000	221,547,000	135,832,000	85,715,000	0.32
International Paper Co.	-35,000,000	25,548,000,000	34,217,000,000	25,963,000,000	8,254,000,000	0.80
Watsco Inc	48,105,000	1,315,024,000	608,289,000	205,551,000	402,738,000	0.60

CONTRACTOR	2005 (USD) Net Profit	Sales	Total Assets	Total Liabilities	Net Worth (TA - TL)	Average Market Cap/Sales
Technip	103,052,800	4,328,217,600	5,874,814,700	4,301,649,300	1,573,165,400	1.30
Granite Construction	83,150,000	2,641,350,000	1,472,230,000	850,670,000	621,560,000	0.48
Matrix Services	-38,830,000	439,140,000	202,380,000	154,400,000	47,980,000	0.31
International Paper Co.	1,100,000,000	24,097,000,000	28,771,000,000	20,420,000,000	8,351,000,000	0.69
Watsco Inc	70,020,000	1,682,720,000	678,730,000	228,080,000	450,650,000	0.77

Table B.2 Control Group Qualitative Data

CONTRACTOR	Green News (2005)	Time since last CEO change
Technip	3	5 yr
Granite Construction	5	19 yr
Matrix Services	0	1 yr
International Paper Co.	6	7 yr
Watsco Inc.	1	33 yr

Table B.3 Control Group Ratios

	2004			2005			
CONTRACTOR	Return on Net Worth (Net Profit/Net Worth)	Return on Sales (Net profit/Sales)	Return on Assets (Net profit/Total Assets)	Return on Net Worth (Net Profit/Net Worth)	Return on Sales (Net profit/Sales)	Return on Assets (Net profit/Total Assets)	P/E (ttm as of 6/2/2006)
Technip	19.5%	2.6%	5.1%	20.9%	3.1%	5.5%	54.82
Granite Construction	4.3%	0.7%	1.1%	6.6%	1.1%	1.9%	19.94
Matrix Services	13.9%	5.7%	4.3%	7.5%	3.2%	2.6%	183.18
International Paper Co.	14.0%	2.0%	4.7%	13.9%	1.7%	5.0%	21.03
Watsco Inc.	33.7%	3.3%	4.6%	60.4%	5.4%	8.1%	22.09

Appendix C.

Table C.1 Industry Ratios

SIC 16	Return on Net Worth (Net Profit/Net Worth)	Return on Sales (Net profit/Sales)	Return on Assets (Net profit/Total Assets)
2004	12.2%	2.5%	5.2%
2005	?	?	?

Appendix D.

Survey:

Introduction

"Green" in this survey means a contractor or facility that has incorporated a concern for people (workers and occupants) and the environment. A green company is one that offers green construction services, is mindful of minimizing the impact of their activities on the environment, and has an eye toward improvements in efficiency and safety. A green building is one that incorporates energy saving systems, water saving systems, improved internal air quality, and is designed and constructed in a way that minimizes its impact on the environment.

Question 1

Would you characterize your company as "Green"? This can manifest itself in offering green construction services as well as using green-minded business strategies.

<u>Characterizations</u>

Yes, in both services offered and business strategy
Yes, in services offered, but not in business strategy
Yes, in business strategy, but not in services offered
No, not in either services offered or business strategy

Question 2

In your experience and estimation, how much of an increase in project cost are owners willing to accept in order to get each of the following green building benefits?

<u>Benefits</u>

Enhanced reputation from owning a green building
Energy cost savings from building systems
Water cost savings from efficient landscaping
Better building environment in terms of light and air quality

<u>Ratings</u>

No increase
Small increase
Moderate increase
Substantial increase

Question 3
How much of a premium are owners willing to pay for a contractor with excellent name recognition and reputation?

Answers
No premium
Small premium
Substantial premium

Question 4
Rank the following factors by how much they impact a company's reputation.

Factor
Services offered
Sales volume
Marketing efforts
Friendly and helpful staff
Past performance

Rankings
Most impact (1)
(2)
(3)
(4)
Least impact (5)
Has no impact

Question 5
What would be the top three advantages of being a green contractor?

Advantages
Cost savings from waste management
Increased profit margin on green contracts
Increased contract size on green projects
Increased market share and sales volume
Better company culture and climate
Increased recruiting strength
Improved reputation and brand name
Reduced workplace hazards and insurance costs

Rankings
Most Important (1)
Second (2)
Third (3)

Appendix E.

Skanska, USA is the domestic construction arm of the international construction giant by the same name. Skanska, USA regards sustainable development as an important business aspect, and they view it as impacting both risk and opportunity. They have four zero goals: zero loss-making projects, zero work place accidents, zero environmental incidents and zero ethical breaches. They were selected as a green contractor for this study as a result of their recognition by the USGBC.

They offer a full selection of services in green construction, and have adopted sustainable practices into their corporation as a whole.

Their last CEO change was in June 2005, and prior to that was constant since their creation in October 2002.

They had 27 positive green news stories published in 2005, showing that they have a commitment to the practice of green construction.

They began domestic operations in October, 2002, and have had a commitment to sustainable construction from the beginning.

Their position in the industry is main-line construction. Skanska's sales volume in 2005 was $18 billion, and their domestic sales volume was just over $4 billion. Their sister company is Matrix Service Company, a large construction company which provides maintenance and repair services as well as construction. Matrix's sales volume in 2005 was $0.4 billion. Matrix is similar in terms of position in the industry. Matrix is the third largest general construction company in the control group, so they are the closest fit for Skanska even though their sales volume is an order of magnitude less. Matrix doesn't attempt to sell themselves by their green construction capability, and they have had less than 5 green news stories in 2005.

Turner Construction is the domestic construction arm of Hochtief Construction, the German construction giant. Turner is committed to the success and increased adoption of sustainable construction practices. They believe Green buildings are not only good for the environment, they also provide immediate and long-term economic benefits for developers, building owners and occupants. Turner has a detailed databank of cost-effective Green materials, processes and suppliers, and they are largely successful in containing the costs of green buildings to a level comparable to traditionally constructed buildings. They were selected as a green contractor for this study as a result of their recognition by the USGBC.

Their last CEO change was in May 1998.

They had 16 positive green news stories published in 2005, showing that they have a commitment to the practice of green construction.

Their commitment to sustainable construction dates back to 2002, when they instituted an award program to recognize their employees' innovation in construction processes. Their position in the industry is main-line construction. Their domestic sales volume in 2005 was about $7 billion.

Their sister company is Granite Construction, another main-line construction company, with sales volume in 2005 of $2.6 billion. Granite is very similar in terms of position in the industry, and is the second largest general construction company in the control group, so they are the best match for Turner, even though their sales volume is lower by a factor of three. Granite also has a quarry operation which Turner does not, but their overall scope is otherwise similar. Their web site has a couple references to their green capability, but it does not appear to be an emphasis area for them, and they had only two green news items in 2005.

Weyerhaeuser is a construction materials company with a domestic construction division. Weyerhaeuser sees their role in environmental leadership as one of the strongest that they have. They are committed to recycling, reducing waste, replanting forests, and saving energy. That gives them a business advantage by reducing costs and identifying them as one of the industry leaders in environmental stewardship.

They were selected as a green contractor for this study as a result of their recognition by the USGBC.

Their last CEO change was in 1997.

They had 37 positive green news stories published in 2005, showing that they have a strong and established commitment to the practice of green construction. Their commitment to sustainable construction dates back to 1971, when they first published their environmental policy, giving public access to their decision processes as they relate to the environment. Their position in the industry is primarily construction material production with a focus on timber related products. Their sales volume in 2005 was $22 billion.

Their sister company is the International Paper Company, another construction material production company with a focus on timber related products and a sales volume of $24 billion. International Paper has a large paper producing operation, but they also produce timber related construction products. Weyerhaeuser has a small construction operation, which International Paper does not, but their size is almost identical, so they are a close fit. International Paper's marketing is focused on their size primarily, and on the environment secondarily. They had 9 green news items in 2005, which is more than the other control group companies because of their direct interaction with forests and the resulting visibility for their environmental policies.

Fluor Corporation is a domestic construction giant. FLUOR®

Fluor is committed to having a positive impact in each community that they touch. They also consider directly the value of their employees, the impact of the workplace, the quantitative assessment of risk of different types, and the interaction of their external stakeholders. This approach gives them a business advantage by enabling their brand reputation, keeping costs visible and minimized, and drawing from the best talent in their recruiting.

They were selected as a green contractor for this study as a result of their recognition in the Dow Jones Sustainability Index for the U.S.

Their last CEO change was in February 2002, and the previous one was in 1998. They had 18 positive green news stories published in 2005, showing that they have a commitment to the practice of green construction.

Their commitment to sustainable construction dates back to 1999, when they published their new Strategic Direction to Increase Shareholder Value. The vision in that document illustrates their corporate commitment to the principles of sustainable construction and business practices. Their position in the industry is main-line construction. Their sales volume in 2005 was $13 billion.

Their sister company is Technip, a large construction company which provides engineering and technological services as well as construction. Technip's sales volume in 2005 was $4 billion. Technip focuses on construction for the petroleum industry, while Fluor provides construction services across several industries. As the largest construction company in the control group, they are a good fit with Fluor. They only had two green news items in 2005, and give very little attention to sustainable construction on their website.

The American Standards Companies, Inc is a producer of construction materials. Their vision is that their customers can look to them for earth-friendly products, and that communities can trust them to be good neighbors. They strive to provide the most energy efficient HVAC products in the industry, and work with their customers to help them add value by lowering their energy usage and greenhouse gas emissions. They also pioneer resource saving technologies in their products such as the aquaforce flushing system and the use of ceramic disks in their valves that resist leaking. These things give them a business advantage by imparting value to their customers and solidifying a strong brand name.

They were selected as a green contractor for this study as a result of their recognition in the Dow Jones Sustainability Index.

Their last CEO change was in January 2000.

They had 19 positive green news stories published in 2005, showing that they have a commitment to the practice of green construction.

Their commitment to sustainable construction dates back to December 2000, when they announced the actions that they planned to take in order to improve productivity and enhance efficiency. This announcement included elements of sustainable business practices including waste minimization. Their position in the industry is the production of building materials and HVAC equipment. Their sales volume in 2005 was $10 billion.

Their sister company is Watsco Incorporated, another building material and HVAC production company, with sales volume in 2005 of $2 billion. Watsco is focused in HVAC production, which Amercian Standard operates to a substantial, but lesser degree. They are the largest viable company in this part of the industry next to American Standard, so they were a natural pair. Watsco only had one green news item in 2005, and their emphasis is on their current growth rather than sustainable business.